The Employee and Accident Prevention

A Practical Manual
For the Worker

The
Travelers Insurance Company
HARTFORD, CONNECTICUT

7459. 5-1-'14.

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PREFACE

This little book is addressed to industrial workers, and particularly to the men and women who are employed in manufacturing establishments and shops. Its purpose is to help these men and women to avoid the dangers to which they are exposed while earning a living. The suggestions that it contains are drawn from the experience and observation of the engineering and inspection division of THE TRAVELERS INSURANCE COMPANY. They are thoroughly practical, and if the workers to whom they are offered will adopt them and profit by them, a marked saving of life and limb will surely result.

It is impossible to make a book of this kind complete and exhaustive, because the number of causes of accidents is too great. Attention has therefore been confined to the commoner causes, and an attempt has been made to keep the book small, and to use simple language, so that every employee who can read English may be reasonably expected to become thoroughly familiar with the whole.

Most of the suggestions that are made are simple and fairly obvious, and some wage-earners may be disposed to treat them lightly for that reason. No

more serious mistake could be made. The great majority of the work-accidents that occur are due to the neglect of precautions of just this kind; and if past experience can enable us to judge the future, more than ten thousand of the workers of the United States who are alive and well to-day will be dead in one year from this date, merely because they *did not heed the suggestions that this little book contains.* Many other thousands will also be maimed for life, for the same reason.

Employees into whose hands this book may come should know its contents fully and thoroughly, and should follow its suggestions faithfully, unless they conflict with special rules or orders that may be issued by the employer on account of special local conditions, or for other good reasons. If there is anything that the workers do not fully understand, either in this book or in the rules that are issued by the employer, or if there is any other point upon which they feel any uncertainty, they should apply to the foreman or to some other proper person, for further explanations or instructions.

THE TRAVELERS INSURANCE COMPANY,
Hartford, Connecticut.

The Employee and Accident Prevention

ACIDS: See CHEMICALS.

AIR: See COMPRESSED AIR.

ALCOHOL: See INTOXICANTS, and WOOD ALCOHOL.

BARRELS: When removing heads from barrels, be careful to see that no nails are left projecting through the sides. Splinters should also be removed. Serious injuries often result from the neglect of these simple precautions. Special care should be taken when storing and piling barrels. If they are laid upon their sides they should be securely blocked to prevent them from rolling, and if they are piled upon end they should be laid up evenly, and in an orderly and systematic

manner. It is dangerous to stand on the head of an empty barrel. If a proper stepladder is not available, and a barrel must be used, a board should be laid across it, long enough to rest upon the staves at both sides.

BELTING: Employees should not shift belts with their hands. If no mechanical belt-shifter is provided, a smooth pole or stick at least 4 feet long should be used. No belt should be tightened or spliced while any of the machinery to which it is attached is in motion. When applying dressing to moving belts, always apply it to the outrunning side, where the belt is moving away from the pulley; and keep the hands as far from the pulleys as possible. Employees should never pass through moving belts, nor over them, unless a safe and thoroughly protected passageway has been provided. Slight electric shocks are often received from moving belts. Although these are quite harmless in themselves, employees should always have them in mind, because a sudden start, due to receiving such a shock unexpectedly, may cause a person to slip or stumble, and to fall upon or against the belt. An idle belt should never be allowed to hang upon or rest against a moving shaft; and if a belt should break and wind up on the shafting, it should not be touched until the shafting has been stopped. Moving belts should not be grasped by the hands for the purpose of stopping machines, nor for any other purpose.

BELTS: See SAFETY BELTS.

BLASTING: See EXPLOSIVES.

BOARDS: See CONSTRUCTION WORK, FLOORS, and SLIVERS.

BOILERS AND OTHER STEAM APPARATUS: Workmen should never tamper in any way with safety-valves on boilers, nor do anything to change the pressure at which these valves are set to blow. The water in the boiler should be kept at the proper level at all times, and leaks of every kind, whether in the boiler or the piping or elsewhere, should be promptly reported to the proper person. Unauthorized persons should not open or close any valves in any steam, water, or air pipes. Special care should be exercised when a boiler that has been out of use for a time is again restored to service, and put in communication with other boilers under pressure. The steam pressure, as indicated by the gages on the several boilers, should be as nearly uniform as possible before the stop-valve on the idle boiler is opened; and when this stop-valve *is* opened, it should be manipulated slowly and with great caution. Similar care should be observed when opening and closing a blowoff valve for the purpose of "blowing down" a boiler, and the valve should be opened and closed very slowly. Many serious accidents occur from operating blowoff valves too quickly.

A man who is about to enter a boiler for any purpose should notify the engineer, or some other responsible person in the boiler room, that he is about to do so. He should also see to it, personally, that the blowoff valve and all other valves on the steam or water connections to the boiler are tightly closed. The main stop valve on the steam pipe should be *locked* in the closed position, and a sign should be placed upon it to warn others that a man is in the boiler. Before removing the manhole cover the safety-valve should be lifted, or the gage cocks opened, to make sure that there is neither pressure nor vacuum in the boiler. Boilers should be thoroughly ventilated before they are entered, to remove any noxious or explosive gases or vapors that may be in them. Vapors of this kind are often present, for example, when kerosene or crude petroleum have been used for removing scale.

Workmen should never make any repairs or adjustments, *however slight they may be*, upon boilers, pipes, valves, or vessels of any kind, while these are under pressure. This is an extremely important precaution, and it is often neglected; but failure to observe it has cost many lives.

Cleaning bars, slice bars, and similar heavy long-handled tools, should be kept in a safe place where they will not be knocked over. They should be hung up, or supported, in such a way that they cannot fall and cause injury.

CARELESSNESS: Carelessness is one of the principal causes of accidents. Employees should therefore exercise reasonable caution in all ways and at all times. Scuffling, "fooling", running about the plant, and voluntary exposure to unnecessary risk, should be avoided, and all the employees should work together to suppress activities of this kind. It is usually the younger and more thoughtless ones who are responsible for the trifling, and for the practical jokes and "horse play"; and the older employees should exert their influence to curb these spirits and maintain order and decorum. Careless and thoughtless acts often result in injury to other persons, as well as to those who are immediately responsible for them. The natural and unavoidable dangers of the work are great enough, and they should never be wilfully or heedlessly increased.

CHAINS AND SPROCKETS: Employees should exercise great care when working near unguarded chains and sprockets, even if these are moving quite slowly; and they should see to it that they have on no loose or torn clothing that may become caught. The point where the chain runs on to the sprocket is especially dangerous.

CHEMICALS: Workmen should use extreme care in handling carboys and other vessels containing acids and chemicals. Gloves of acid-resisting material

should be worn, and the shoes of the men should be of the "congress" type, with elastic tops fitting snugly around the ankles and legs. All acid-containers should be set upright on a level and secure foundation, and should be kept tightly stoppered. Carboys of every kind should be handled with special care, and when they are set down or moved about they should not be subjected to shocks or violence of any kind. All containing vessels that are cracked or otherwise damaged should be reported at once, and they should not be handled until some competent and responsible person in authority has examined them and determined the nature and importance of the damage. In all cases workmen should scrupulously observe and faithfully follow any special instructions that may have been issued in connection with the handling or use of the special chemicals that may be employed. Nobody should touch them, nor deal with them, except the particular employees who are designated for this purpose. The fumes of the chemicals should be avoided as much as possible, and in every uncertainty the employee should err on the safe side. Every person who works with chemicals should inform himself with regard to the antidotes for them, and should know exactly what to do if he should be burned or poisoned or otherwise injured by them.

Employees working with or near acids, alkalis, or chemicals of any other kind, should be especially care-

ful to see that the drinking glasses that they use are clean, and they should never swallow any liquid without knowing, with absolute certainty, what it is. (See also CLEANLINESS.) The danger of swallowing corrosive or poisonous substances by mistake is by no means confined to chemical works, nor to manufacturing plants. Muriatic acid, for example, is used for washing down the walls of buildings, and as it is often carelessly left standing about in pails, it is frequently mistaken for drinking water, with serious consequences.

CHIPPING: Workmen engaged in chipping metal, stone, or concrete, should wear goggles to protect their eyes. If screens are provided, to protect other workmen from flying particles, they should be faithfully used. When the work is of such a character that heavy blows are struck, and safety handles are provided for holding the chisels, these handles should be invariably used. Chisels should be returned for redressing, when they have become burred or mushroomed from protracted use. (See also INJURIES.)

CLEANLINESS: Employees should keep their persons and their clothing as clean as possible. Careful attention to this point fosters self-respect and wonderfully improves the general tone in the plant, and it also has other more material advantages. In case of injury, for example, the danger of serious consequences

from infection and blood-poisoning is lessened in a marked degree. Cleanliness is of special importance in plants in which poisonous substances are used, because in such places health and disease often depend directly upon the personal habits of the employee in this respect,—scrupulous cleanliness preserving health, while laxity and carelessness bring disease. Employees who have to deal with poisonous substances should make free use of soap, warm water, hand brushes, and tooth brushes,—particularly before eating and before leaving the workplace. Special attention should be given to the mouth and to the spaces around the finger-nails and under them. Neglect of precautions of this kind is particularly common among painters, who often eat without thoroughly cleansing their hands, and who frequently suffer from lead poisoning as a result. In working with poisonous substances it is sometimes highly important to change the clothing throughout, upon entering or leaving the workplace, and to bathe the entire body before quitting work and putting on the street clothing. (See also CHEMICALS, and NEATNESS.)

CLOTHING AND HAIR: Employees whose duties require them to operate machines, or to be near them, should avoid torn or ragged clothing, and should keep their outer garments buttoned or otherwise fastened, so that they cannot become entangled in the machinery. They should also exercise caution in re-

moving or putting on clothing near moving machinery. Female employees should be especially careful to keep their clothing and hair from being drawn into gears and machines or wound upon shafting, and caps or nets should be worn to confine the hair. Congress shoes, fitting snugly about the ankles and legs, should be worn by workmen handling molten metal, hot fat, and similar hot liquids. Soles of shoes should in all cases be free from holes that may catch on splinters in wooden floors, or that may allow the feet to be cut by stepping upon nails, broken glass, or other sharp objects. Collars, cuffs, eye-shields, or cap fronts, should not be made of celluloid or similar highly-inflammable material, if they are to be worn by men who may be working near an open flame or in a place where sparks are likely to fly about. A celluloid collar, once afire, cannot be torn off quickly enough to prevent injuries of the most serious character.

COMPRESSED AIR: Compressed air is a very simple and useful servant, but serious accidents occur every little while from playing pranks with it. Workmen should never blow compressed air upon one another. They should not trifle with it in any way, but should use it only for the purposes for which it is provided.

CONSTRUCTION WORK: Employees should never ride on material hoists, nor slide down hoist ropes,

nor expose themselves unnecessarily to dangers of any kind, either to save time, or out of mere bravado, or for any other reason. The natural hazards that are inherent in the work, and inseparable from it, are fully great enough, without multiplying them needlessly. Loose planks or boards, used in laying temporary floors, should be placed so that the ends cannot tip when stepped upon, and they should be laid tightly together so that small tools and materials cannot fall down between them. Workmen needing boards or planks should never take those that have been laid down for the protection of other workmen on floors below; and if it is necessary to remove some of these planks for a time, in order to perform necessary work where they have been laid, they should be carefully and conscientiously replaced, in good order, as soon as possible. Splintered boards, and boards with projecting nails, should not be left about; and all passageways and gangways should be kept as free from obstructions as possible.

Various other sections of this pamphlet should be studied in connection with construction work. Special attention should be paid, for example, to the sections treating of CHIPPING, ELEVATORS, EXPLOSIVES, HOISTING MACHINERY, LADDERS, NAILS, and SCAFFOLDS.

CONVEYORS: Employees should exercise care when cleaning under conveyors, and the cleaning should

be done, as far as possible, only when the conveyors are at rest. Workmen should not ride upon conveyors nor step over or across them while they are in motion. Stock or material should not be allowed to accumulate in too great quantities at the discharge end of the conveyor. Loose boards or other objects lying near conveyors, and situated so that persons might stumble over them and be caught by the conveyors, should be removed.

CUTS: See CLEANLINESS, and INJURIES.

DASH-POTS: See ENGINE ROOMS.

DEVICES, SAFETY: See GUARDS.

DYNAMITE: See EXPLOSIVES.

ELECTRICAL APPARATUS: Employees who are not specially engaged in electrical work should not tamper with any electric wires whatsoever, nor with electrical apparatus of any kind; and any repairs that may be necessary on such apparatus should be made by a competent and skilled electrician. The current should be cut off, whenever this is possible, from circuits upon which men are working; but every circuit should be treated as though it were live, even though the workmen may feel certain that it is dead. When working upon a circuit known to be live, the work should

be done with one hand, as far as possible,—the other being held behind the back. Employees should wear rubber gloves when working about electric generators, motors, or transformers, or upon conductors used for conveying electric currents for power or lighting; and they should never touch high-tension wires, under any circumstances, until they have assured themselves, with absolute certainty, that the current is off. Electricians should not roll up their sleeves, but should keep all parts of their bodies covered, while at work. It is important, also, for their hands and clothing to be as dry as possible, and when working in damp places extra precautions should be taken. Workmen on overhead lines should wear safety belts. Dark-colored glasses should be worn by the men, when looking at intensely brilliant arcs. Extension cords conveying electric currents should not be hung on metallic rods, nor on pipes or nails; and they should not be allowed to lie in pools of water or oil that may be standing upon the floor.

Every electrician should know exactly what to do in the various emergencies that are most likely to arise in connection with his work, and he should thoroughly understand how to conduct artificial respiration work, by at least one of the standard methods. (See also WIRES.)

ELEVATORS: Employees should never enter or leave an elevator of any kind, while it is in motion.

Before an elevator is taken from one floor by a person on another floor, a suitable signal should always be given; and the elevator should not be moved, after the signal has been given, until there has been time for any person who may be in danger to respond, and to move into a place of safety. The elevator platform should always be brought level with the floor before attempting to roll a truck or other load on to it. No unauthorized person should ever use an elevator; and when a regular attendant is provided, he should be the only person to operate it. Never scuffle or "fool" on elevators, nor allow anyone else to do so. Be sure that the gate is closed (if not of the automatic type), before starting the elevator; and do not open the gate at the next landing until the car has been brought to a full stop. Before starting the elevator be sure that no part of the load projects beyond the edge of the platform, and see that the load is safely stowed, so that it cannot shift or become displaced. In case of trouble with the elevator, or in case there seems to be anything unusual in its action, report immediately to the foreman, and do not operate it until the trouble has been remedied. The safe capacity of the elevator should be known in every case, and this load should never be exceeded.

EMERY WHEELS: Operators of emery wheels, and of other grinding wheels of similar nature, should wear substantial and effective goggles or eye-protectors,

to prevent injury to the eyes; and when the work is of such a nature that respirators are provided for the employees, these should be faithfully worn also. Emery and grinding wheels are likely to burst if they are run at speeds higher than those for which they were designed and made. Hence employees should never speed them up without consulting the foreman. Care should be taken to keep the rests properly adjusted, and to prevent the work from swinging against the grinding wheel, and from becoming jammed.

ENGINE ROOMS: Employees should not go inside of the railings around engines or flywheels for any purpose whatever, while the engines are running. Before attempting to turn an engine over by hand, care should be taken to see that the throttle-valve is closed tight; and before taking off a cylinder head, or removing a piston from a cylinder, the workmen should make sure that both the throttle and the exhaust valves are closed, and should open the drain pipes and the indicator-cocks, to see that no pressure remains in the cylinder. Before starting an engine the steam pipe and cylinders should be thoroughly drained, to remove any water of condensation that may be in them. With the drip pipes still open, the throttle-valve should then be "cracked" (or opened by a very small amount), so that steam may gradually enter the cylinder and heat it up to the working temperature. When the cylinder has become

thoroughly heated the engine may be started slowly, but the drips should not be closed until all danger of water collecting in the cylinder is past. As soon as the regular running speed is attained the attendant should make sure that the governor is controlling the engine properly. All parts of the engine should be kept in good adjustment, and all nuts and keys should be kept tight. Any knocks or pounds or unusual noises about the engine should be located as soon as possible and the trouble remedied. Engine governors should receive special attention, and be kept in good working order at all times. If the belt of a belt-driven governor becomes worn or oil-soaked, it should be replaced at once. Care should also be taken to see that the governor pulleys or gears are tight on their shafts. The safety-cams should not be removed or set back, and the governor should not be blocked, nor should anything be done to render it inoperative. The governor stop-pin should always be removed immediately after starting the engine.

The dash-pots on Corliss engines should receive the same care and attention as the governor. They should be kept oiled and properly adjusted, so as to give the correct cut-off and have the full amount of drop, and to work in harmony with the governor in the control of the engine. Careful attention should also be given to the packing of the valve stems, because if this is too tight the valves may stick, thereby delaying the cut-off and causing the engine to speed up.

All moving parts of the engine should be thoroughly lubricated, and automatic lubricators should be inspected frequently, to see that they are feeding properly. The lubricant should be suitable for the work. Light oil should not be used in cylinders, and heavy grease should never be used in the oil-pots of governors.

Special care should be taken to avoid accidents in starting gas engines. The proper procedure varies with the size and make of the engine, and if the attendant does not understand how the operation should be performed he should ask for instructions. He should never, under any circumstances, stand upon the spokes of the wheel, nor thrust bars between the spokes.

Employees from other parts of the plant should not loiter in engine rooms, and should not enter them at all, except as their duties may require them to do so. They should never touch anything about the engines.

EXPLOSIVES: Especial precautions are necessary in connection with the storage and handling of explosives. Nobody should handle dynamite or other high explosives, nor assist in handling them, until he has received adequate instructions from some experienced person. The explosives should be kept under lock and key, in a special storehouse or magazine, located in a safe place. Nobody but the foreman should have access to this storehouse, and no more of

the explosive should be removed from it at any one time than is actually required for the work immediately in hand. A wooden mallet and a wooden wedge should be used for opening boxes of dynamite, and the blows that are struck should be as light as possible. Smoking, and the use of open-flame lights of any kind near explosives, should be absolutely prohibited. Care should be taken to see that no one is dangerously near when a shot is about to be fired. Blasting caps should not be stored in the same place as the explosive itself, and they should not be introduced into the cartridges until these have been carried to the workplace, and all is ready to put the cartridges in place, in preparation for the blast. The blasting caps should be fastened to the fuse by a crimping tool, specially made for the purpose, and never by using the teeth or by other makeshift methods. Tamping should be done with copper or wooden rods, and never, under any circumstances, with iron or steel rods, nor with rods having any iron or steel about them, whatsoever. If a blast misses fire, nobody should go near the place for at least two hours, and it is safer to stay away for a whole day. No attempt should be made to remove the old charge. A new hole should be made near the old one, and a new shot fired. In cold weather dynamite should be thawed in special thawing kettles, by the use of warm water; but it should never come in direct contact with the water. It should never be exposed to the direct heat of a fire, nor placed

in ovens, nor on shelves over stoves or steam radiators. Sticks of frozen dynamite should not be bent, nor slit, nor disturbed any more than necessary, in any other way; because the sensitiveness of the dynamite is often increased very materially by freezing.

Nitroglycerin, when taken internally, acts powerfully upon the heart and the nervous system. Gloves should therefore be worn when handling dynamite, to prevent absorption of nitroglycerin through the skin.

EYES: All employees should take special care of their eyes. If they cannot see distinctly, or if their eyes give them trouble in any other way, they should immediately consult a good oculist, or a competent physician who thoroughly understands the eye. He will determine the nature of the trouble and will usually be able to correct it. It is a serious mistake to neglect the eyes even for a short time, or to use glasses bought from spectacle venders without a proper examination. (See also GOGGLES, and INJURIES.)

FANS: Employees should exercise care when working near or passing by fans used for ventilating or for other purposes, because loose parts of the clothing may be drawn into the fans and become entangled in the blades, so as to cause serious injuries.

FIRE PRECAUTIONS: Employees should not smoke about the workplace, and should not carry

matches into it. Inflammable materials should be kept well away from gas jets, and should be stored in *small* piles, so far as possible. Combustible waste of any kind should never be left lying about, especially when leaving the workplace at night. Cotton rags and waste are particularly dangerous when damp with turpentine or oil, because material of this nature often takes fire spontaneously. Benzine, gasoline, and other volatile and inflammable liquids should never be used near a burning gas jet, nor near fires of any kind, nor near lighted lanterns, cigars, pipes, or cigarettes; and the safest rule is, to avoid using them in any room in which there is an open light or a fire of any kind. (See also GAS, and GASOLINE.)

Every employee should understand the operation of fire-extinguishers, so that he can use them without delay in case they are needed. Every employee should also know the location of the nearest fire-alarm box, and should know exactly how to operate it, so as to give the alarm promptly. If a fire does break out, the employees should deal with it in a sane and rational way. Excitement and disorderly behavior only add to the danger; and the probability of escaping in safety is greatly increased if the employees remain cool and clear-headed.

FLOORS: Slippery substances, such as grease and oil, that may fall or be spilled upon floors, should

be cleaned up immediately. Nails, rope, cord, broken glass, and sharp pieces of metal should not be left lying about, and boards with splintered surfaces should be removed. Nails that project from the floor itself should be driven in. Temporary openings in floors should be effectively guarded, and the covers should be replaced as soon as possible. (See also NAILS, NEATNESS, and SPITTING.)

GAS: In case of leakage of illuminating gas, or of inflammable gas of any other kind, never hunt for the leak with a lighted match, nor with any other kind of an artificial light except an incandescent electric lamp. Turn off the gas supply, if it is possible to reach the stop-cock without entering a dangerous atmosphere in doing so, and ventilate the room in which the leak exists, as thoroughly as possible, before going into it. (See also VAPORS.)

GAS ENGINES: See ENGINE ROOMS.

GASOLINE: Workmen should use great care in handling gasoline, and should never smoke, nor use open lights, nor light matches, in rooms where gasoline is being used for any purpose. Dangerous quantities of gasoline vapor often remain in barrels and cans after the liquid has been emptied from them, and care should therefore be exercised in the use of open lights around

such barrels and cans. Employees should be constantly on the watch for leaks in gasoline pipe-lines, and in tanks or containers of any kind; and if any such leaks are discovered they should be immediately brought to the attention of the foreman.

GLASS: Broken glass should not be left lying about, but should be cleaned up immediately. Workmen should use great care when handling broken bottles, or other broken articles of glass or earthenware. Whenever practicable, stout gloves should be worn while engaged in this way.

GOGGLES: Workmen engaged in chipping or grinding operations, or in handling melted metal, should wear substantial and effective goggles to prevent injury to the eyes. (See also EYES, and INJURIES.)

GRINDING WHEELS: See EMERY WHEELS.

GUARDS: Guards that have been placed on or around machinery, for the protection of the employees, should not be removed or tampered with in any way, without proper authority. If they become broken or inoperative for any reason, or if the exigencies of the work require their removal, the attention of the foreman should be called to them immediately. Guards that have been removed for the purpose of making

repairs, or for any other reason, should always be replaced as soon as possible. Employees should suggest additional safeguards, wherever their experience indicates that such safeguards are needed.

HAIR: See CLOTHING AND HAIR.

HOISTING MACHINERY: Operators of electric cranes should never leave their cages without first opening the main switch. No unauthorized person should ever attempt to operate a crane, and a load should never be moved until the crane operator has received a signal from the proper person. To avoid swinging the load against the workmen the crane should be placed directly over the load in every case, before beginning to hoist. Workmen should never ride on a load that is being lowered or hoisted or transported by a crane, nor on the crane hooks. Great care should be exercised in slinging the loads, to see that the slings are properly arranged, and that the loads are properly balanced and securely fastened, so as to prevent any possibility of slipping. Employees should keep out from under loads that are being hoisted, or that are being carried by cranes. Operators of hand-operated hoists should have the load under control at all times, and should be careful not to lower too fast. Workmen should not grasp the cable just above the lower sheave-block, as there is danger that the hand may be drawn in-

to it. No ropes, chains, cables, blocks, slings, or other hoisting apparatus should be used, except those given out for the purpose by the foreman, or by some other person in authority. All hoists should be kept under perfect control, at all times. No load, even though it be exceedingly light, should be allowed to go down rapidly, so as to make the handle of the winch revolve at high speed.

Slings should always be long enough not only to surround the load they are to support, but also to leave a considerable space between the load and the hook. The part of a sling which extends from the hook to the first point of contact with the load should never make an angle of less than 45 degrees with the ground. This precaution is highly important, but it is often overlooked or neglected, because few workmen realize that the stress on the ends of a sling is greater, the flatter (or more nearly horizontal) they lie. When the ends are inclined at an angle of 45 degrees, the stress upon them is about 41 per cent. greater than it would be if they were vertical; and if the sling is so short that it barely goes around the load and has but little slack, the stress upon it may be very great indeed.

INJURIES: Every injury that may be received should be promptly reported, no matter how trivial it may be. Very slight injuries sometimes require immediate attention to prevent the possibility of infection and blood-poisoning. An injury of any kind should be

cared for by a physician, or by some other equally competent person. Except in emergencies, no employee should undertake to care for his own injuries, nor for those of others, unless he has had proper instruction in first-aid work. Eyes are often permanently harmed, or even destroyed, by neglect or by well-meant but unskilled treatment. (See also CLEANLINESS.)

INTOXICANTS: Employees should avoid the use of alcoholic drinks of any kind during working hours or before them. This applies to beer, whiskey, and all other drinks in which alcohol occurs. Alcohol dulls the senses, impairs the judgment, and makes the nerves and muscles act more slowly. Abstinence during working hours is therefore important, because a mere fraction of a second often makes all the difference between safety and serious bodily harm. (See also SICKNESS.)

LADDERS: Broken, weak, or rickety ladders should never be used. Ladders should always rest firmly upon a level surface, and special care should be taken to prevent them from slipping at the foot. Employees should not use ladders that are not provided with non-slipping pads or spikes, or made safe from slipping in some other equally effective way. Ladders should also be secured at their upper ends, so that they cannot fall sidewise, nor be overthrown in any other

way. Workmen should not carry anything on ladders that will interfere with the free use of both hands for holding on to the ladder, and they should always grasp the sides rather than the rungs of the ladder. Workmen should not slide down ladders, and should always face them when ascending or descending. Stepladders should be fully opened out, in all cases, before anyone steps upon them.

LIGHT: Employees should not expose their eyes to extremely intense light, unless they are protected by dark glasses. Going into dark rooms without a light is always dangerous, and is especially so if the dark spaces contain unguarded openings, moving machinery, or obstructions of any kind, or if they have slippery or uneven floors. (See also EYES.)

MACHINES AND MACHINERY: Employees should never undertake to operate machines with which they are unfamiliar. Machines should not be oiled, cleaned, or repaired while they are in motion. If a machine gets out of order, or if there is anything about its operation that is not understood by the workman in charge of it, he should immediately report to the foreman, and should not operate the machine until the trouble has been remedied. Guards should never be removed from machines, nor rendered inoperative in any way; and if they become broken or are displaced

for any reason, work should be discontinued until they are in place again. (See also GUARDS, above.) Operators of high-speed machines, especially, should pay strict attention to their duties, and should not look around or talk with other employees while the machines are in motion. If it is necessary to look away or to speak to someone, the employee should either stop his machine or step well away from it. When machines are out of use the power should be shut off and the machines stopped, not only to save wear and tear and the cost of the power, but also to prevent accidents. Employees should be constantly on the alert while in proximity to moving machines of any kind, and especially when near unprotected gears, roll-feed machinery, pulleys, and belts.

MATERIALS, STORAGE OF: See STORAGE.

METAL SCRAP: Torn and jagged pieces of sheet metal, scrap iron, and tin should not be left lying about, and special care should be exercised when handling them. Stout gloves should be worn whenever engaged in this work, if practicable.

NAILS: Loose nails should not be left lying about on floors or benches. This is important at all times and under all conditions, and it is particularly so when the nails are rusty and dirty. Planks, boards,

old box covers, and other fragments of wood, are often left about under foot with nails projecting from them, and these are frequent sources of injury. Nails should be at once removed from wooden objects in which they have served their usefulness, or else they should be driven in so as to leave the surface quite smooth, or bent over and their points effectively hammered in. If the exigencies of the case require the removal of the wooden pieces without taking the time required to attend to the nails properly, they should be arranged in orderly piles, with the points of the projecting nails directed downward; but as soon as these piles can receive attention, the nails should be removed or treated as indicated above.

NEATNESS: All work should be done in a neat and orderly manner. Tools and materials should not be allowed to lie about in confusion. Special care should be taken in connection with all sanitary arrangements, to keep them in the best condition possible. Neatness in this respect is conducive to health, comfort, self-respect, and general good feeling among the employees. (See also CLEANLINESS, and SPITTING.)

OILING: Machinery should never be oiled while it is in motion. Oilers should wear closely-fitted clothing, with no torn, loose, or ragged ends. When ladders are used they should be firmly placed on a level

surface, and special care should be taken to prevent them from slipping. Ladders should never be set against revolving shafting.

PAINTING: See CLEANLINESS, and VAPORS.

POISONS: See CHEMICALS, CLEANLINESS, and VAPORS.

RAILROAD DANGERS: Employees should avoid, as far as possible, crossing any railroad tracks, or being upon them except as their duties require it. They should not pass under stationary cars, nor climb up between them instead of going around. Before crossing railroad tracks, the employee should look carefully in both directions; and if it is necessary to walk upon the tracks for any reason, he should be constantly watchful for trains or locomotives coming in either direction.

When stock or material is stored near a railroad track there should be a clearance of at least six feet between the track and the piles. If for any reason it is impossible to obtain this amount of clearance, conspicuous warning signs should be placed at both ends of the piles to prevent persons from passing between them and the tracks.

When loading or unloading cars from sidings directly into a building, the workmen should make sure

that the gang planks are in good condition, and that they are properly placed and secured to prevent slipping. Hand trucks used for transporting freight should be kept in good repair, and any that are broken or defective should be put out of service. Loose boards and rubbish should not be left lying between the tracks, but should be cleaned up immediately. Employees should not get on or off moving cars, nor go between them to couple or uncouple them, nor for any other purpose. Special care should be taken when loading cars with explosives, dangerous chemicals, or highly inflammable goods, to see that the boxes or packages are properly stowed and effectively secured, so that they cannot be thrown about and broken by the motion of the cars.

SAFETY BELTS: Window cleaners, and men working on smokestacks or doing similar work at a considerable height above the ground, should wear safety belts with safety lines attached.

SAFETY DEVICES: See GUARDS.

SANITARY ARRANGEMENTS: See CLEANLINESS, and NEATNESS.

SCAFFOLDS AND STAGINGS: Scaffolds and stagings should be built with care, and in strict conformity with the laws and ordinances that relate

to them in the locality in which they are erected; and every man who has to use a scaffold should satisfy himself of its safety before he ventures out upon it. When a scaffold is once completed, no part of it should be removed, except by direction of the foreman or some other person in authority. Care should also be taken to avoid depositing materials against poles that support a scaffold, and to avoid colliding with these poles with wagons. Employees working upon scaffolds should be careful not to drop tools or materials upon persons below. They should also be careful not to overload the platform by placing an excessive amount of material upon it. Materials, when deposited upon the scaffold platform, should be let down gently and easily; because loads that are thrown down from the shoulder jar the scaffold so that it is likely to become weakened, and to fall. (See also NAILS.)

SICKNESS: Employees should never work when sick, nor when they are unfit, for any other reason, to perform their tasks in a safe and proper way. To neglect this advice is to court danger; and it is far better to lose a little time than to lose a finger or an eye or a hand or a foot. Employees often work when they should not do so, merely because they do not like to "give up" to a slight indisposition. This is often a mistake, particularly when the persons concerned are at work about machinery, or upon scaffolds, or in other

especially dangerous places. Simple disorders like drowsiness from loss of sleep, or dizziness from a temporary attack of indigestion, may lead to serious consequences. Employees who are afflicted with epilepsy or any other serious ailment should notify the foreman of the fact, so that they may be set at work at tasks for the performance of which they are fitted.

SIGNS: Employees should pay scrupulous attention to all warning signs that may be posted in or about the workplace. These signs are displayed for the purpose of pointing out dangerous conditions, and any instructions they may bear should be faithfully carried out.

SLINGS: See HOISTING MACHINERY.

SLIVERS: Employees should be mindful of slivers in floors, platforms, railings, and ladders, and should exercise care in handling rough and splintered boards and planks.

SPITTING: Employees should never spit on the floor. This practice is exceedingly unpleasant to others, and it is also unsanitary, especially when the offender is suffering from a cold, or from catarrh, or from other more serious ailments. In some cases the men indulge in it so freely that the floors become slip-

pery and dangerous in many places. The habit is a disgusting one, and it should be severely discountenanced by the workers themselves.

STORAGE: Materials should not be stored in passageways or gangways, nor on stairs. The storing and piling of materials of all kinds should be carefully done. The piles should be laid up level, and should be braced or shored, if necessary, to keep them from falling over. Stock that is stored on shelves should be arranged with the heavier articles on the lower shelves, and the ends of the articles should not be allowed to project over the edges of the shelves, so that there is danger that they may fall off. Loose, light material should not be left on roofs or other elevated places, where it may be blown off and injure those below. (See also RAILROAD DANGERS, and BARRELS.)

SUGGESTIONS TO FOREMEN: Employees should feel free to offer any suggestions that may occur to them regarding safety in their work. These will always be carefully considered, and will be adopted if believed to be practical. Ideas for installing additional guards on machines, or improving existing ones, should be submitted to the foreman of the department, unless some other person has been specifically designated for this purpose, and such ideas will receive due consideration. Employees are urged to do all in their

power to make the working conditions safer, and by doing so they will benefit not only themselves, but their fellow employees also.

TEAMING AND TRUCKING: Team drivers should not attempt to climb up to their seats while the teams are in motion. Children should not be permitted to ride on the rear end of the wagon, nor to "steal" rides. Horses that are left standing attached to wagons should never be left unhitched. Team drivers, and other persons working around or near vicious horses, should be watchful at all times, to avoid being kicked or bitten. Loads should be so arranged and secured as to prevent any part of them from sliding or falling out of the wagon. Skids should be firmly placed, and when possible, should be fastened to prevent them from slipping. When heavy objects are being removed from a wagon, the wheels of the wagon should be blocked, and the brakes should be set. Drivers should take every precaution to prevent collisions with other vehicles, and should drive carefully, without taking chances of any kind.

When the load consists of metal rods or other objects of similar nature, which extend beyond the wagon box at the rear, the projecting ends should always be covered by pads of burlap, for the protection of persons on the streets or crossings.

Many of the precautions that are noted above in

connection with teams, are applicable to motor trucks also. The operator of a gasoline motor truck should be careful to avoid "kicks" from the starting handle. The truck should not be left standing without first setting the brakes up tightly. Unauthorized persons should not operate motor trucks, nor should they tamper with them in any way. Operators should immediately report any trouble with the brakes or steering mechanism, and should see to it that these parts are kept in good working order. Drivers should have their cars under control at all times, and should never operate them in a careless or reckless manner. (See also GASOLINE.)

TOOLS: Sharp-edged or otherwise dangerous tools should not be left lying about, nor should they be handled by persons unfamiliar with the use of them. Files should not be used without handles. It is dangerous to use sledges, cold-chisels, and other similar tools, having burred or "mushroomed" heads. Implements of this kind should be dressed as often as may be necessary to keep them in good condition. Tools with loose or broken handles, or defective in any other way, should not be used. Sharp tools should not be left on elevated shelves or stepladders, nor on overhead work, where they may be pushed off and injure persons below.

TRENCHES: Workmen in trenches or excavations of any kind should be careful not to work so closely

together as to strike one another with picks or other implements. When leaving work, the barriers or lanterns that are used for guarding the openings should always be replaced. The trenches should be shored up whenever there is danger of a cave-in.

VAPORS: Great care should be exercised, particularly in closed rooms, in working with paints and other fluids containing alcohol, crude oil, benzine, "banana oil", bisulphide of carbon, or other poisonous or inflammable substances. No artificial lights should be used in working with such substances, except incandescent electric lamps, properly guarded against breakage. Smoking is exceedingly dangerous in connection with such work. The rooms or spaces in which the men are employed should be ventilated as thoroughly as possible, and when the work is of such a nature that respirators are provided, these should be faithfully worn by the employees at all times. Similar precautions should be taken when working with chlorine, sulphur fumes, acetylene, carbon monoxide, or other poisonous or inflammable gases. (See also Gas.)

WINDOWS: Employees should not throw articles of any kind out of windows, nor should they lean out of windows except when it is necessary to do so. In case of such necessity, they should grasp the sill or frame firmly, and take care to avoid falling. Do not

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lean against the glass in windows, and do not pu against it for any purpose, because it may break a cause severe cuts.

Safety belts should be worn by all persons engag in cleaning windows on the outside. When a ladde used, the workman should see that it rests firmly o level surface where it cannot slip, and that it is sou and strong. If necessary for safety, another workm should hold the ladder to steady it. Ladders sho never be leaned against windows. If it is necess to use a common ladder in front of a window so that top of the ladder comes opposite the glass, a stout pi of wood should be firmly nailed across the upper end the ladder, long enough to bear upon the wall at e side of the window. Employees should never w along narrow ledges on the outside of buildings.

WIRES: Employees should never touch fal or dangling wires, but should call the attention of foreman to them, so that they may receive immedi attention from some qualified person who has b especially assigned to this work. (See also ELECTRI APPARATUS.)

WOOD ALCOHOL: All persons should kn that *wood alcohol* is an active poison, and that w swallowed in any considerable quantity it will probs produce death, or total and permanent blindness.